
INTERNATIONAL STANDARD



4704

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Glass plant, pipeline and fittings — Glass plant components

Appareillage, tuyauterie et raccords en verre — Éléments d'appareillage en verre

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4704 was developed by Technical Committee ISO/TC 128, *Glass plant, pipeline and fittings*, and was circulated to the member bodies in April 1976.

It has been approved by the member bodies of the following countries :

Austria	Korea, Rep. of	Switzerland
Czechoslovakia	Mexico	Turkey
France	Poland	United Kingdom
Germany	Romania	
Italy	South Africa, Rep. of	

No member body expressed disapproval of the document.

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Glass plant, pipeline and fittings – Glass plant components

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0 INTRODUCTION

This International Standard deals with a selection of components of glass plant, mainly in nominal bores in the range from 80 to 1 400 mm. Some nominal bores and sizes which are not being manufactured at the time of drafting this International Standard have been included, with the aim of extending to future manufacture the essential requirements of compatibility and interchangeability, the achievement of which is the main purpose of this International Standard.

This International Standard should be read in conjunction with ISO 3585, ISO 3586 and ISO 3587.

This International Standard covers a limited series of components for which important elements of standardization could be agreed relatively rapidly. It may be possible subsequently to deal similarly with other components which involve greater difficulties in standardization.

Where dimensions have not been standardized but are to be given by the manufacturers, this is for one of the following reasons :

- that standardization of a dimension, or other particular feature, would apply an undesirable restriction on future development of the component;
- it has not been possible to reach agreement on a standard dimension because of the different manufacturing methods in current use, which themselves involve high capital investment;
- the standardization of a dimension would involve the cost of change without the basic advantages of compatibility and interchangeability.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the essential requirements for compatibility and interchangeability of components of glass plant, to the extent that these objectives are attainable, bearing in mind the differences in basic design features between the products of different manufacturers. It not only specifies standardized dimensions but, where applicable, lists additional information which should be given by the manufacturers, either in catalogues or supplied to users on request.

2 REFERENCES

ISO 2034, *Pipeline flanges for general use – Metric series – Mating dimensions.*

ISO 3585, *Glass plant, pipeline and fittings – Properties of borosilicate glass 3.3.*

ISO 3586, *Glass plant, pipeline and fittings – General rules for testing, handling and use.*

ISO 3587, *Glass plant, pipeline and fittings – Pipeline and fittings of nominal bore 15 to 150 mm – Compatibility and interchangeability.*

3 MATERIAL

The components referred to in this International Standard shall be manufactured from borosilicate glass 3.3, which is resistant to both heat and chemical attack. Its properties are given in ISO 3585.

4 WORKING TEMPERATURES AND WORKING PRESSURES

The maximum working temperatures and pressures of components and installed systems shall not exceed those recommended by the manufacturer.

with flat buttress ends is the distance between the joint faces (see figure 1). For spherical buttress ends see ISO 3587.

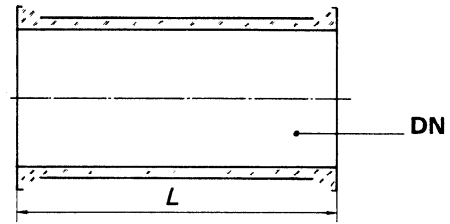


FIGURE 1 – Overall length of component

5 BASIC DIMENSIONS

5.1 Nominal bores (DN)

The nominal bores are : 80 – 100 – 150 – 200 – 225 – 300 – 400 – 450 – 600 – 800 – 1 000 – 1 200 – 1 400 mm.

5.2.1 Tolerances on length

The tolerances on length L , together with dimensions L_1 and L_2 of components included in this International Standard shall be as given in table 1 for nominal bores in manufacture at the time of drafting this International Standard.

5.2 Length

All lengths of components shall be multiples of 25 mm if possible unless otherwise stated. The length L of components

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TABLE 1 – Tolerances on lengths L , L_1 and L_2

Dimensions in millimetres

DN	Tolerances on lengths L , L_1 and L_2									
	200	225	250	275	300	400	500	1 000	1 500	2 000
80	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 4	± 4
100	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 4	± 4
150	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 4	± 4
200	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 3	± 4	± 5
225					± 3	± 3	± 3	± 3	± 4	± 5
300						± 4	± 4	± 4	± 5	± 5
400							± 5	± 5	± 5	± 5
450							± 5	± 5	± 5	± 5
600							± 7	± 7	± 7	± 7
800							± 10	± 10	± 10	± 10
1 000							± 10	± 10	± 10	± 10

6 COMPATIBILITY

6.1 Flat buttress ends

In order to ensure that these various shapes of buttress ends and flanges on pipes supplied in materials other than glass can be bolted together, an annular zone is required which will accept a suitable gasket and which is common to products of different manufacture. Compatibility is achieved with manufacture which is current at the time of drafting this International Standard within the limits of dimensions given in table 2.

To ensure compatibility in the future, note should be taken of these dimensions.

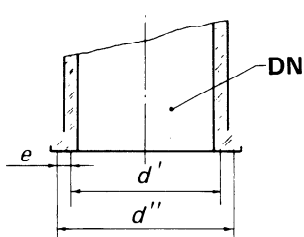


FIGURE 2 – Annular zone

6.2 Adaptor flanges

Because of the availability of glass components with different buttress end forms, backing flanges supplied by manufacturers of glass plant differ in shape, pitch circle diameter and the number and diameter of bolt holes.

To ensure that these various forms of buttress ends can be bolted together, an adaptor flange shall be used which is appropriate to the buttress end. The adaptor flange shall have the pitch circle diameter and the numbers of bolts specified for NP 10 in ISO 2084 (see table 3).

6.3 Gaskets

For sealing between buttress ends of different shapes, a gasket with a diameter suitable to the annular zone defined in 6.1 shall be used.

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TABLE 2 – Annular zone which ensures compatibility of flat buttress ends (see figure 2)

Dimensions in millimetres

DN	80	100	150	200	225	300	400	450	600	800	1 000
d' max.	87	111	163	216	235	312	420	479	628	840	1 035
d'' min.	93	117	169	227	255	334	442	490	650	890	1 065
e min.	3	3	3	5,5	10	11	11	5,5	11	25	15

TABLE 3 – Selection from, and adaptation of, mating dimensions given in ISO 2084 for adaptor flanges

Dimensions in millimetres

DN	80	100	150	200	225	300	400	450	600	800	1 000	1 200	1 400
Pitch circle diameter d	160	180	240	295	325	400	515	565	725	950	1 160	1 380	1 590
Number of holes n	8	8	8	8	8	12	16	20	20	24	28	32	36
Diameter of holes d_1^*	9,5	9,5	10,5	11	11	11	11	14	14	14	14	18	18

* These diameters are adapted to the requirements of glass plant and are smaller than those given in ISO 2084.

7 PIPE SECTIONS (see figure 3)

7.1 Description

A pipe section is a straight length of pipe fitted with buttress ends.

7.2 Standard dimensions (see table 4)

DN = nominal bore

L = overall length of pipe section

NOTE – Table 4 shows a series of diameters and lengths from which a selection can be made.

TABLE 4 – Dimensions of pipe sections

Dimensions in millimetres

DN	L
80	
100	
150	
200	
225	
300	500
400	1 000
450	1 500
600	2 000
800	
1 000	
1 200	
1 400	



FIGURE 3 – Pipe section

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8 COLUMN SECTIONS (see figure 4)

8.1 Description

A column section is a component provided with means of supporting packing and which, if required, incorporates a connection for a thermometer pocket.

8.2 Standard dimensions (see table 5)

DN = nominal bore

L = overall length of column section

NOTE – Table 5 shows a series of diameters and lengths from which a selection can be made.

8.3 Information to be given by manufacturer

H = height available above packing support

A = % effective free cross-sectional area of packing support

Position and dimensions of connection for thermometer pocket where applicable.

TABLE 5 – Dimensions of column sections

Dimensions in millimetres

DN	L
80	
100	
150	
200	
225	
300	500
400	1 000
450	1 500
600	2 000
800	
1 000	
1 200	
1 400	

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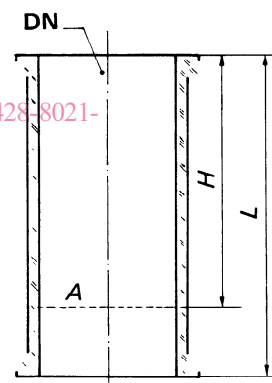


FIGURE 4 – Column section

9 THERMOMETER POCKETS (see figure 5)

9.1 Description

A thermometer pocket is a component suitable for containing a thermometer or other temperature-sensing element.

9.2 Standard dimensions (see table 6)

DN = nominal bore of component

d = minimum bore of pocket

L_1 = length of pocket beyond joint face

9.3 Information to be given by manufacturer

L = overall length of thermometer pocket

L_2 = minimum length over which thickness s applies

s = wall thickness over distance L_2

The use of multiples of 25 mm for dimensions L and L_2 is not necessary.

TABLE 6 – Dimensions and tolerances of thermometer pockets

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DN	d	L_1 ± 3
25	15	100
		125
		150
		175
40		200
		250
		300
50		400
		500

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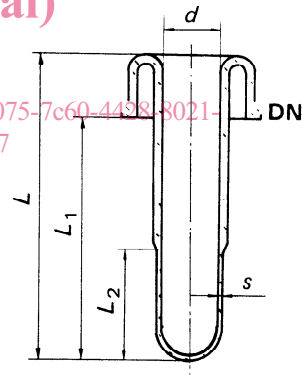


FIGURE 5 – Thermometer pocket

10 UNEQUAL TEES (see figure 6)

10.1 Description

An unequal tee is a component suitable, for example, for introducing fluid into a column or pipeline. It has a nominal bore equal to that of the column or pipeline and one side connection of reduced nominal bore.

10.2 Standard dimensions (see table 7)

DN = nominal bore of component

DN₁ = nominal bore of side connection

L = overall length of unequal tee

10.3 Information to be given by manufacturer

L₁ = distance from axis of component to buttress end face of side connection

TABLE 7 – Dimensions of unequal tees

Dimensions in millimetres

DN	DN ₁	L
25	15	150
40	25	200
50	25	200
	40	200
80	40	250
	50	250
100	40	250
	50	250
150	40	250
	50	250
200	50	250
	80	300
225	50	300
	80	300
300	50	400
	80	400
	100	400

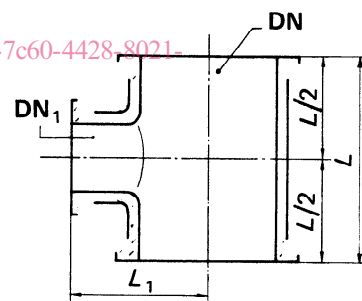


FIGURE 6 – Unequal tee